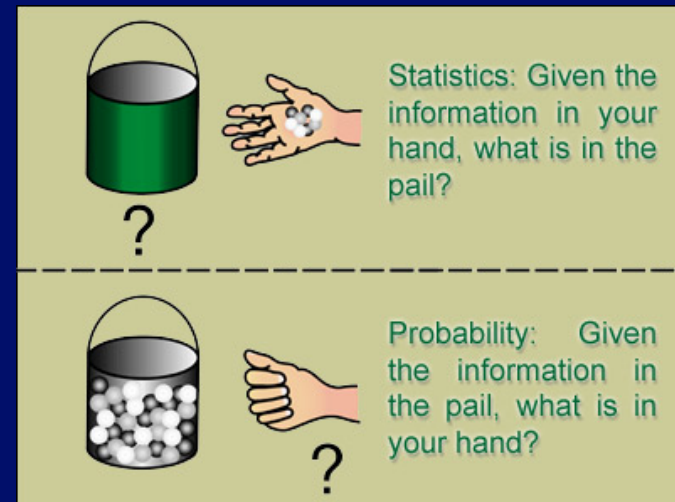
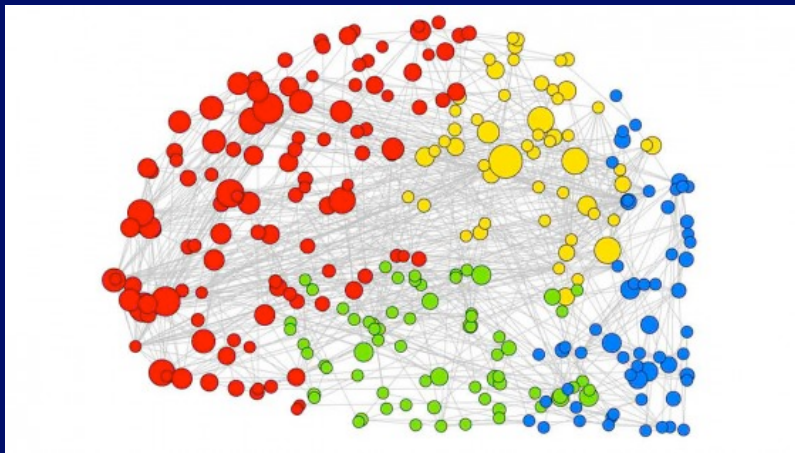


Using Statistics to Make Connections in Grades 6-8

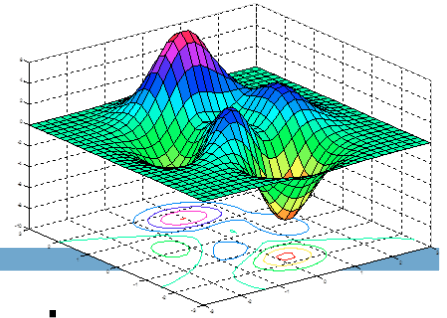


Presenter:

Diane Kinch

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Mathematical Modeling



“Modeling is the process of choosing and using appropriate mathematics and statistics to analyze empirical situations, to understand them better, and to improve decisions.”

Process:

- Identify variables and select those that are essential
- Formulate a model to describe the relationships
- Analyze and perform operations to draw conclusions
- Interpret results in the light of the context
- Validate the conclusions
- Report on the conclusions and the reasoning behind them

Statistical problem solving is an investigative process that involves four components:

I Formulate Questions

- clarify the problem at hand
- formulate one (or more) questions that can be answered with data

II Collect Data

- design a plan to collect appropriate data
- employ the plan to collect the data

III Analyze Data

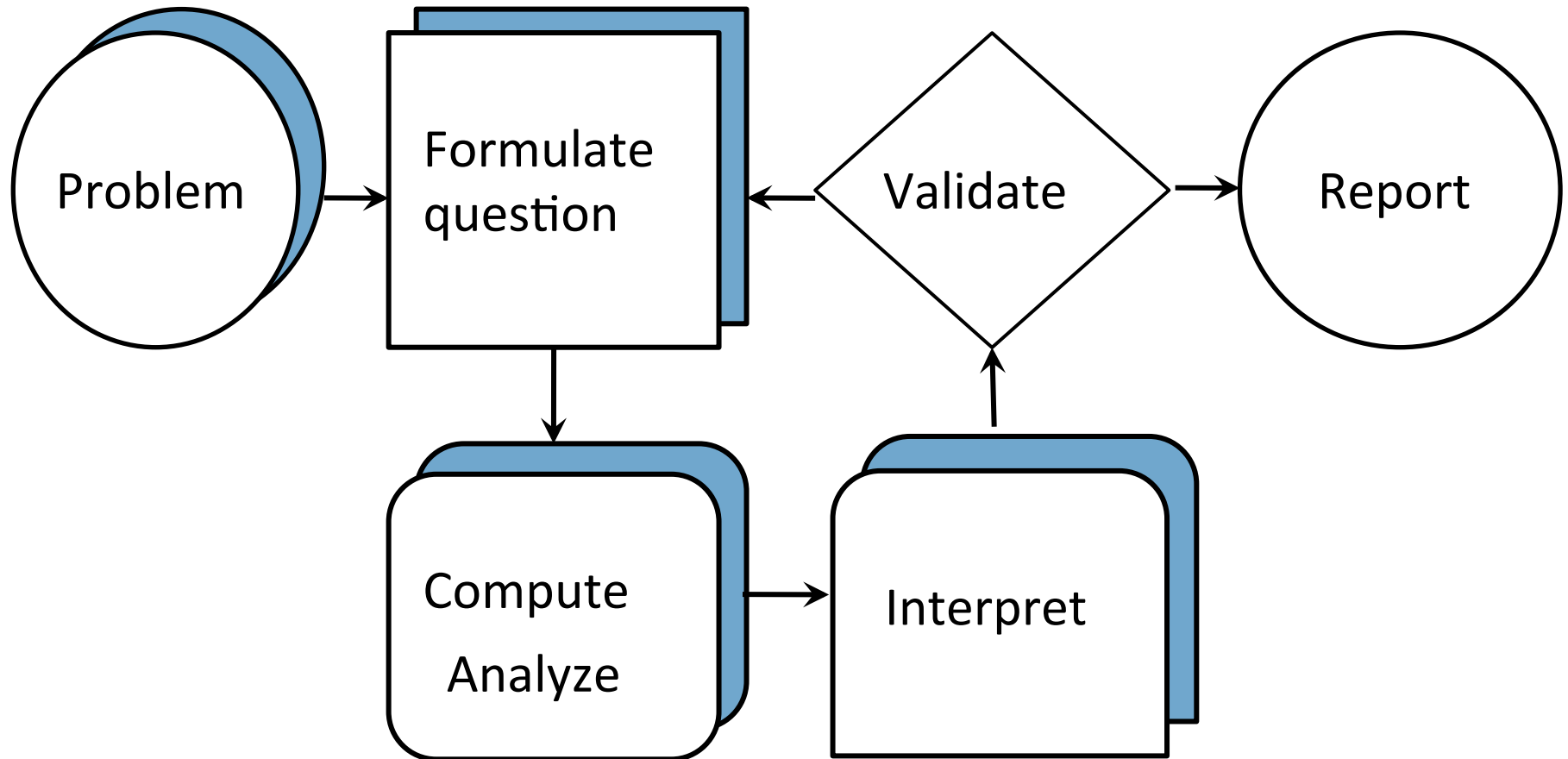
- select appropriate graphical and numerical methods
- use these methods to analyze the data

IV Interpret Results

- interpret the analysis
- relate the interpretation to the original question

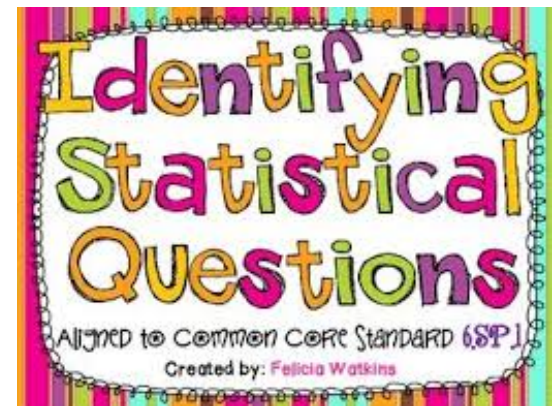


Modeling & Statistics



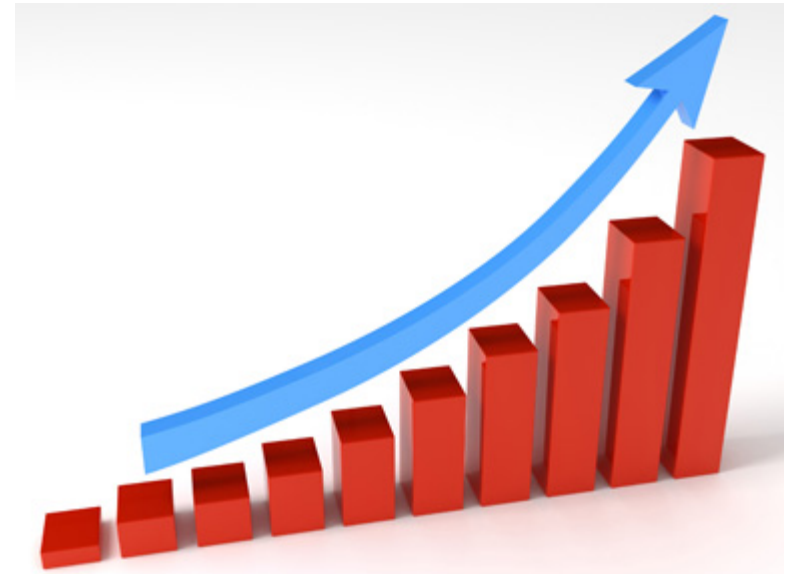
Statistical Questions

A statistical question is one that anticipates variability in the data related to the question and accounts for it in the answers. For example, “How old am I?” is not a statistical question, but “How old are the students in my school?” is a statistical question because one anticipates variability in students’ ages.



Statistics Progression

- Discrete vs Continuous
- Data Collection
 - Measurement
 - Counting – **Called categorical data in GAISE**
- Data Displays
- Data Variability Measures
- Probability
- Fitting Curves to Data
- Probability of Data Variability



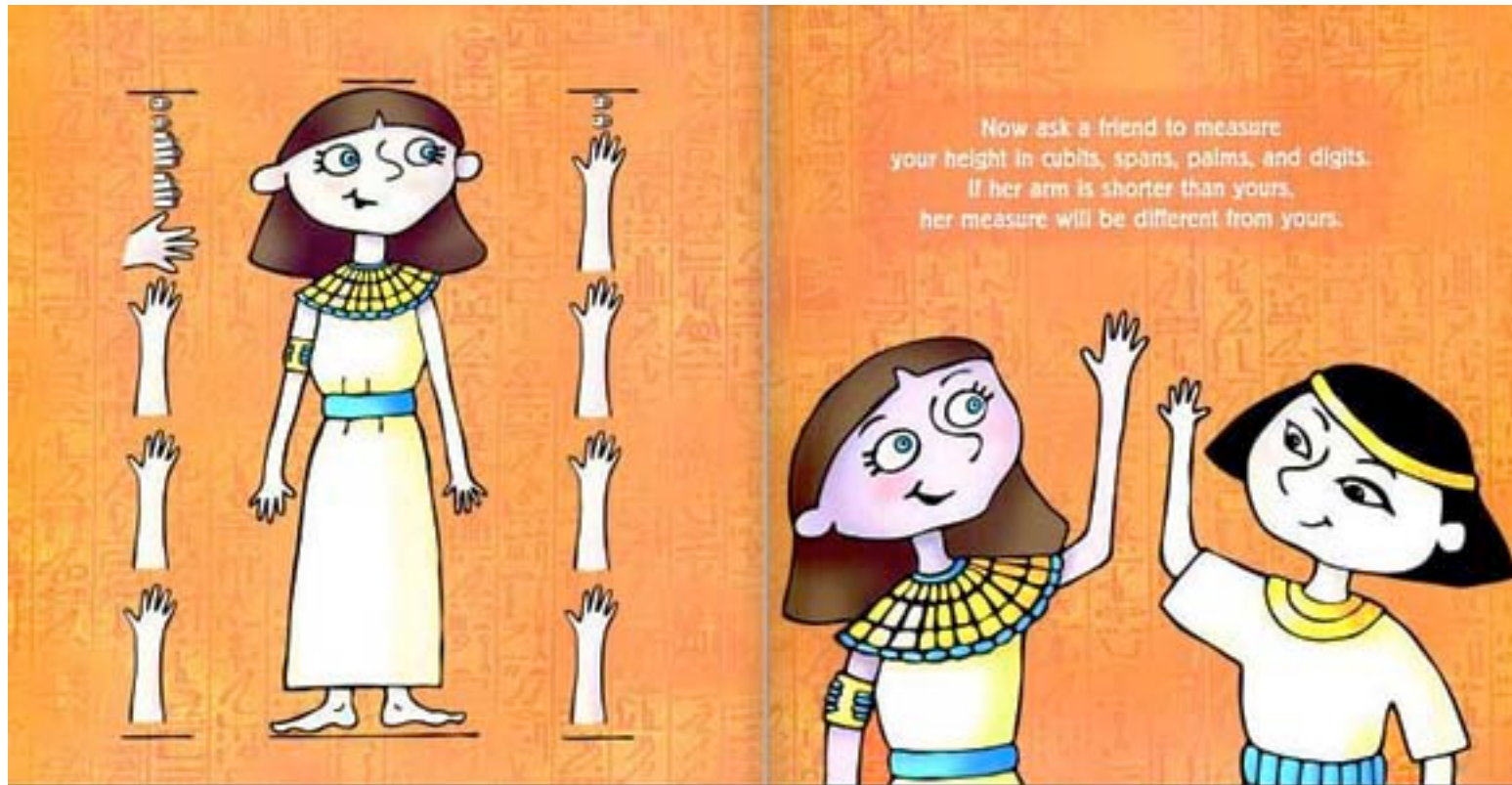
Statistics, Access, and Equity

- The study of statistics offers opportunities for Culturally Responsive Instruction by allowing students to collect and analyze real-world data relevant to their lives
- The study of statistics requires teachers to attend to issues of language through
 - Reading
 - Writing
 - Listening
 - Speaking



History of the Cubit

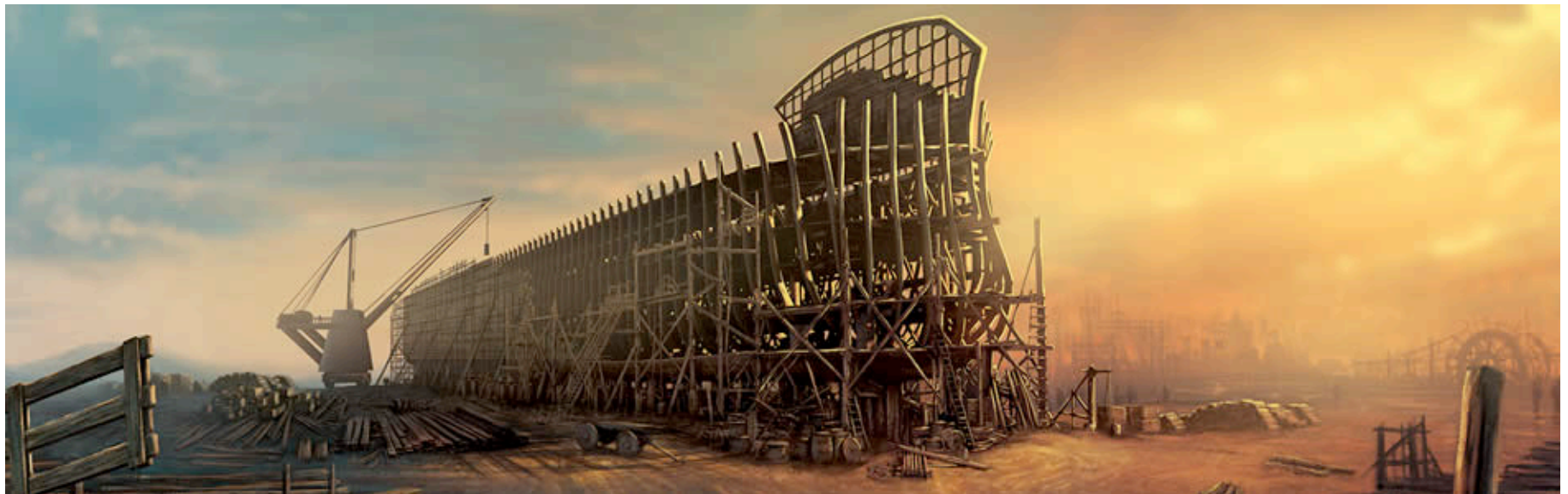




Now ask a friend to measure
your height in cubits, spans, palms, and digits.
If her arm is shorter than yours,
her measure will be different from yours.

Culture	Inches (centimeters)
Hebrew (short)	17.5 (44.5)
Egyptian	17.6 (44.7)
Common (short)	18 (45.7)
Babylonian (long)	19.8 (50.3)
Hebrew (long)	20.4 (51.8)
Egyptian (long)	20.6 (52.3)

When Noah came off the Ark, only one cubit measurement existed—the one he had used to construct the Ark. Unfortunately, the exact length of this cubit is unknown. After the nations were divided, years later at the Tower of Babel, different cultures adopted different cubits.



Cubits

1. Formulate questions:

- How do the lengths of cubits of everyone in our classroom compare?

2. Collect Data:

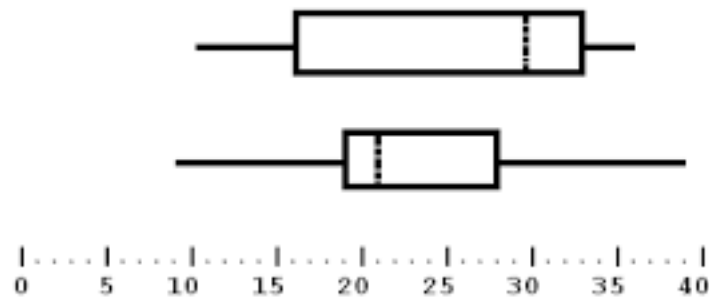
- In pairs, measure each other's cubit in centimeters. Let's all use our dominant arm for this. Why?
- Once you have measured each other's cubits make note of the measurement and add it to the data chart.

Number	Name	Cubit Length (cm)	Male (M) or Female (F)
1			
2			
3			
4			
5			
6			
:			

Cubits

3. Analyze Data

- Once the data has been gathered, make a box and whiskers plot for the length of the boys' our cubits.

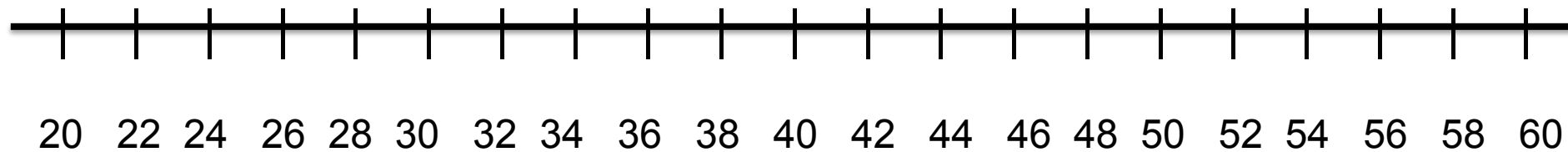


Our Data

Measure	Length of cubit (M)	Length of cubit (F)	Length of Cubit (M & F) (cm)
Minimum			
Lower Quartile Value			
Median			
Upper Quartile Value			
Maximum			
Range			
Interquartile Range (IQR)			



Everyone



Length of Cubit in cm.

Analysis

1. Is there a significant difference between the cubits of the people sampled? How do you know this?
2. Are the measurements more diverse in one quartile more so than in others?
3. Are there any outliers in your data? What makes this an outlier?

CA Common Core Standards

Grade 6 Statistics and Probability

Summarize and describe distributions.

4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
5. Summarize numerical data sets in relation to their context, such as by:
 - a. Reporting the number of observations.
 - b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
 - c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
 - d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

Idea Wave

- Part I: Adding Conjectures



- A conjecture is listed below for each of the four given graphs. You are to list 2 additional conjectures you have about each graph

- Part II: Sentence Starters

- Knowing what you do about Box and Whisker plots finish the following conjectures. Be prepared to give evidence for your conjectures.



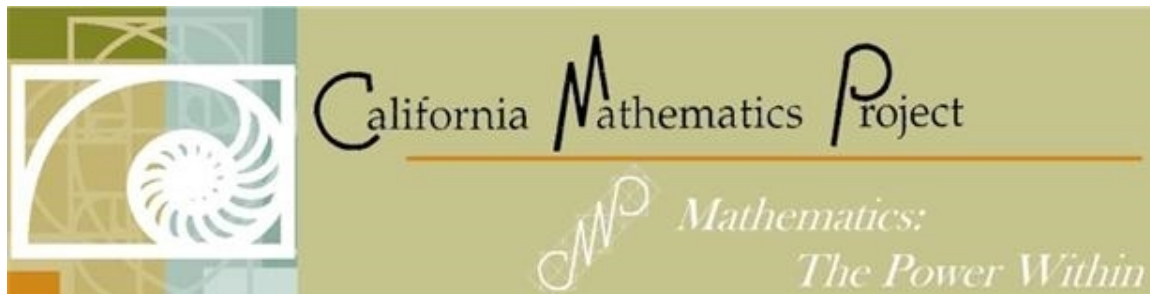
- Part III: Sharing Out

Listen carefully as your classmates share their ideas and experiences during the Idea Wave discussion.

Jot down two statements that they make that you found particularly interesting and also write the names of your classmates who contributed these ideas.



Our Organizations



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Ensuring Equity and Excellence in Mathematics For ALL

June 23-25, 2016

Scottsdale Plaza Resort, Phoenix, AZ



Participants will leave with important tools, strategies, ideas, and models for their own settings so they can advocate for and enact mathematics teaching that increases Equity, Access, and Achievement for ALL students through rigorous and coherent mathematics.

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